

CENTER PIVOT WING FLOTATION METHOD AND **APPARATUS**

BACKGROUND OF THE INVENTION

[0001] The present invention relates generally to a method and apparatus for providing flotation to a wing of a multi-piece toolbar of an agricultural implement, and more particularly to such method and apparatus that employs a center pivot arrangement on the wing of an agricultural seeder.

[0002] It is well known that various agricultural implements, such as tillage equipment, seeders, and crop harvesting equipment are constructed in large part of multiple sections arranged end to end transversely to the direction of travel of the implement to provide a relatively wide operational path. Of course, in general, the wider the operational path, the more efficient and cost effective the process, and in farming as in any other business, time is money.

[0003] Most often the implement includes a main structural frame centrally mounted on its own wheel structure, and the other sections, which include toolbars and structural members, that are usually disposed at both ends of the central main frame. These other sections are in the form of wings that may be folded upward to make the overall width less and thereby place the implement in transport position. When the wing sections are in their lowered work position, they are usually carried on their own wheels or other supporting mechanisms.

[0004] In some known implements, the pivot connection which is provided between the frame of the wing and the central main frame is arranged so that a rigid connection is formed between the main frame and the wing frames when the wings are

lowered to their operative positions, but such a structure has the disadvantage of causing the ground working parts of the implement to vary their relation to the ground surface as the implement passes over uneven terrain. An arrangement such as this decreases in efficiency as the width of the implement or the unevenness of the ground increases. To overcome these problems, there have been designed pivoting connections between the main frame and the frames of the wings which allow the wings to pivot relative to the main frame. These designs, too, do not provide a completely satisfactory solution to the problems, i.e., they do not accommodate ground unevenness well, because the wings only pivot about an axis located at their inner ends.

[0005] There have been other attempts at improving the flotation of implement wings, some better than others, but improved flotation has generally only resulted from designs that are complex, and expensive, and difficult to operate.

[0006] It would be advantageous to have a method and apparatus that provide flotation for the wings of an agricultural seeder that overcomes or significantly reduces the disadvantages of prior such systems, as described above.

SUMMARY OF THE INVENTION

[0007] It is an object of the instant invention to provide an improved flotation system for the wings of a ground engaging agricultural implement.

[0008] It is another object of the instant invention to provide an improved flotation method and structural arrangement for the wings of an agricultural seeder.

[0009] It is yet another object of the instant invention to provide an improved flotation system for the wings of an agricultural seeder that centrally pivots each wing from the main frame of the implement.

[0010] It is an even still further object of the instant invention to provide a flotation system for the wings of an agricultural seeder that is durable in construction, inexpensive to manufacture, carefree of maintenance, facile in assemblage, and simple and effective in use.

[0011] These and other objects and features are obtained by providing a flotation method and apparatus for a the wings of an agricultural seeder that are centrally suspended from the main frame such that individual wings are pivotable centrally of the longitudinal axis therefore to better follow the contours of the ground.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The advantages of this invention will become apparent upon consideration of the following detailed disclosure of the invention, especially when taken in conjunction with the accompanying drawings wherein:

[0013] Fig. 1 is a rear plan view of an agricultural implement showing a central main frame with wings depending from either end thereof, sitting on level ground; and

[0014] Fig. 2 is a rear plan view, similar to Fig. 1, showing flotation of the wings when the implement sits on uneven ground.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0015] Many of the fastening, connection, processes and other means and components utilized in this invention are widely known and used in the field of the invention described, and their exact nature or type is not necessary for an understanding and use of the invention by a person skilled in the art, and they will not therefore be discussed in significant detail. Also, any reference herein to the terms "left" and "right", or "up" and "down" are used as a matter of mere convenience, and are

determined by standing at the rear of the mechanism facing in its normal direction of travel. Furthermore, the various components shown or described herein for any specific application of this invention can be varied or altered as anticipated by this invention and the practice of a specific application of any element may already be widely known or used in the art by persons skilled in the art and each will likewise not therefore be discussed in significant detail.

[0016] Fig. 1 depicts a rear elevational view of a seeder 10 as it sits or moves forward along generally level ground, G1. The structure of a seeder is generally well-known in the agricultural industry, and, since no specific model or arrangement of most seeder elements is important to the present invention, only those parts necessary to impart a clear understanding of the invention are shown. For a more complete description and depiction of the various components of an exemplary seeder, attention is directed to U.S. Patent No. 6,125,775.

[0017] Referring again to Fig. 1, the seeder 10 is shown to comprise a central main frame 12 that would be removably connected to a tractor for forward movement and as a source of hydraulic power. Main frame 12, and the majority of the constructional elements of seeder 10, are constructed primarily of steel box beams or pipes of various inside dimensions. Seeder 10 is supported above the ground, and when in the transport mode, by multiple wheels (not shown) generally symmetrically located at positions appropriate for safety and function. Two independent toolbars or wings, generally shown as 14 and 16, provide complete support for the seed-planting units (not shown), discs 18 and other necessary operational elements. Discs 18 and some other components of the seeding mechanism are usually supported on multiple structural members spaced horizontally from each other, though interconnected. While two wings are shown in the drawings, it is possible to support additional laterally extending wings in a manner similar to that to be described below.

[0018] Wings 14, 16 are totally supported from main frame 12 by a pair of support arms 22, 24, respectively. Support arms 22, 24, are pivotally connected at one end to the upper portion of main frame 12, respectively, by pivot pins 28, 30. The location of pivot pins 28, 30, is not necessarily high on main frame 12, though such a location permits a simplified construction. The other ends of support arms 22, 24, are pivotally affixed to respective wings 14, 16, by pivot pins 32, 34. Pins 32, 34 are located generally centrally along the length of the respective wings. By raising (hydraulically) the wheels (not shown) the distance between the ground, G1, and the wings 14, 16 may be increased sufficiently to permit the wings to be pivoted, or folded, into a transport position where they are generally at least vertically directed. Hydraulic cylinders 40, 42, which can be located in a number of positions and arrangements, raise and lower the wings.

[0019] Referring now to Fig. 2, the flotation provided by the system of the instant invention to the toolbars 14, 16 can be observed on uneven ground, G2. With the hydraulic cylinders 40, 42 locked in the lowered position, the wings are allowed to pivot about the centrally located pins 32, 34, and closely follow the contours of the ground G2. A good flotation system in a seeder assures more even plantings, with more uniform depth and germination—all important characteristics of good crop production.

[0020] It will be understood that changes in the details, materials, steps and arrangements of parts which have been described and illustrated to explain the nature of the invention will occur to and may be made by those skilled in the art upon a reading of this disclosure within the principles and scope of the invention. The foregoing description illustrates the preferred embodiment of the invention; however, concepts, as based upon the description, may be employed in other embodiments without departing from the scope of the inventions. Accordingly, the following claims are intended to protect the invention broadly as well as in the specific form shown.